

STATEMENT OF GUY S. GARDNER, ASSOCIATE ADMINISTRATOR FOR  
REGULATION AND CERTIFICATION, FEDERAL AVIATION ADMINISTRATION,  
BEFORE THE HOUSE COMMITTEE ON TRANSPORTATION AND  
INFRASTRUCTURE, SUBCOMMITTEE ON AVIATION, CONCERNING THE  
INSTALLATION OF TCAS II ON CARGO CARRIER AIRCRAFT. FEBRUARY 26,  
1997.

Mr. Chairman and Members of the Subcommittee:

Mr. Chairman, if I may, I would like to take a moment before beginning my testimony to introduce myself. I am Guy Gardner, and I am pleased to be serving as FAA's Associate Administrator for Regulation and Certification. I look forward to working with you and the other distinguished Members of this Subcommittee on the many important and challenging aviation issues that will be facing this Congress.

I welcome the opportunity to appear before you today to discuss the petition concerning installation of the Traffic Alert and Collision Avoidance System, or TCAS II, on cargo carrier aircraft. You have also asked me to discuss new technology currently under development known as Automatic Dependent Surveillance-Broadcast, or ADS-B. Joining me today are David Harrington, FAA's Acting Deputy Director for Flight Standards, and Ronald E. Morgan, FAA's Director of Air Traffic.

As you know, the FAA is reviewing a petition for rulemaking filed by the Independent Pilots Association (IPA) that asks the FAA to mandate installation of TCAS II on transport category aircraft flown in all-cargo operations. I appreciate the Subcommittee's decision to hold a hearing on this issue. The testimony presented today will be included in the rulemaking docket; therefore, the agency will have the benefit of today's discussions before making its decision on the petition. Although I cannot discuss our ongoing deliberations concerning the petition, this hearing is an opportunity for us to hear your concerns and the concerns of others who will be testifying today. Mr. Harrington

and I will be happy to address technical questions you may have concerning operation of these systems.

You have asked me to comment on two particular systems: TCAS and ADS-B. I will briefly discuss TCAS, how it works, and the success we have had with the system. I will also explain how ADS-B is intended to work and the additional benefits ADS-B could provide. Unlike TCAS, ADS-B is not a collision avoidance system, and it does not have a proven track record.

TCAS was developed to reduce the potential for mid-air collisions. The system was designed to operate independently from the air traffic control (ATC) system and to serve as a back-up to the ATC system. TCAS operates by transmitting interrogations that elicit replies from transponders in nearby aircraft. The system tracks aircraft within certain range and altitude bands to determine whether they have the potential to become a collision threat.

There are two levels of TCAS protection currently in use, known as TCAS I and TCAS II. Passenger aircraft or combination cargo/passenger aircraft with 10 to 30 seats must be equipped with TCAS I. TCAS II is required for passenger aircraft with more than 30 seats, as Congress directed. These aircraft, as well as aircraft used in all-cargo operations, must also be equipped with transponders, which would indicate their presence to any TCAS-equipped aircraft. If TCAS I perceives the intruder aircraft as a threat, it will provide the pilot with a visual and audible traffic advisory (TA), which gives the intruder aircraft's range, relative altitude, and bearing. TCAS II, in addition to traffic advisories, provides the pilot with a resolution advisory (RA), which suggests a vertical maneuver to avoid the intruder aircraft.

By every indicator, TCAS has been a success. TCAS II is the most common collision avoidance system in use throughout the world today. It has been in operation on various types of aircraft since 1990 worldwide. Today, over 10,000 airline, corporate, and military aircraft are equipped with TCAS II and over 80 million hours of operation have been logged. The number of reported near mid-air collisions in the U.S. has decreased significantly since 1989, during a period when both passenger and cargo air traffic increased substantially. Many foreign countries are mandating the installation of collision avoidance systems and TCAS II is becoming the standard. By the year 2000, the European Community plans to require TCAS II technology on all civil turbine aircraft weighing more than 15,000 kilograms (approximately 33,000 pounds). Australia, Japan, and India have announced similar plans.

In addressing ADS-B, I would like to clear up a misconception that may have arisen. ADS-B, standing alone, is not a collision avoidance system, and is not an alternative to TCAS. ADS-B is a technology that is intended to support surveillance of aircraft while airborne and on the airport surface. This technology uses the global positioning system (or GPS) and a radio frequency link to broadcast information between aircraft as well as between aircraft and ground-based ADS-B receivers. An aircraft equipped with ADS-B would broadcast its aircraft identification, along with position, velocity, and other time-sensitive surveillance information, to other aircraft and it would receive the same information from other aircraft. But ADS-B is not a collision avoidance system, and would need to be supplemented to provide such protection.

Although ADS-B does not have the operational history enjoyed by TCAS, it does have a potential for improving the range, accuracy and reliability of the air-to-air surveillance information that TCAS uses for collision avoidance. These potential benefits derive principally from the fact that TCAS units must actively interrogate transponders in

nearby aircraft, while the ADS-B technique obtains surveillance data simply by listening for ADS broadcasts from other aircraft.

Although ADS-B technology may be promising, there are several significant issues that need to be addressed. Many of the technical standards for ADS-B have not been agreed upon, either in the United States or internationally, and several key technical issues regarding applications of ADS-B message sets need to be developed. In addition, ADS-B must be operationally tested. There are no aircraft equipped with ADS-B in service today, and much work needs to be done before ADS-B can be used to support a collision avoidance system.

Air cargo operators have proposed a phase-in plan that would have the ADS-B system fully operational by the year 2001. Projections that propose full operational capability of ADS-B by the year 2001 would be challenging, given the number of technical hurdles that lie ahead. However, the agency is interested in working with industry to develop and implement this technology. As announced by Vice President Gore in January, and noted in the White House Commission's recommendations for accelerating modernization of the national airspace, we are developing a plan to demonstrate this system.

As I stated earlier, Mr. Chairman, I want to thank you for holding this timely hearing. The IPA petition and the cargo industry's proposal concerning ADS-B raise complex safety and policy issues. We have not yet reached a final determination whether to require cargo carriers to equip with TCAS II, or whether to pursue other alternatives. Many factors need to be balanced, and we will consider these issues very carefully in making our decision on IPA's petition for rulemaking. Today's discussions will help the agency develop a thoughtful and responsible resolution.

Mr. Chairman, that completes my prepared statement. I would be pleased to respond to any questions you and the other Members may have at this time.